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The Innovation of Training and Improvement of the Quality of Human Resources in the Construction Industry in Vietnam

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Abstract: The development of human resources to meet the requirements of industrialization, modernization and international integration is always a problem for industries and localities, including the construction industry. Human resources in the construction industry include cadres and civil servants in charge of state management, professional officers in non-business units, engineers as technicians in enterprises, and workers in the field of construction. The reality of the training and use of human resources in the construction industry in Vietnam currently has many aspects that have not met the needs of the labor markets as well as the task of developing the industry when international integration is deeper and wider and the requirements for the development of a knowledge economy. Therefore, the innovation of training for the improvement of the quality of human resources in the construction industry is a key and urgent task to ensure the development of the construction industry in Vietnam in the coming time.

Key words: human resources in the construction industry, innovation, and improvement of training quality

1. Introduction

After 35 years of renovation, Vietnam's economy has made remarkable changes and got great achievements. From an underdeveloped country with a backward economy due to the effects of the war, Vietnam has now become a middle-income developing country with a dynamic market economy, and deep, wide and strong integration. Vietnam's economic scale has increased rapidly (12 times), of which per capita income (GDP per capita) increased by 8.3 times; export-import increased 29.5 times; foreign direct investment (FDI) increased 22 times (compared to 1986); and foreign exchange reserves (compared to 1987) increased 47.6 times (Phuong Anh, Tu Lu, 2021).

In order to maintain a stable growth rate of the economy, it is necessary to have the right and synchronous strategic solutions to promote long-term economic growth, in which, renovation of training to improve the quality of human resources, especially human resources for the construction industry, is a central and urgent task because the current training system cannot meet those requirements.

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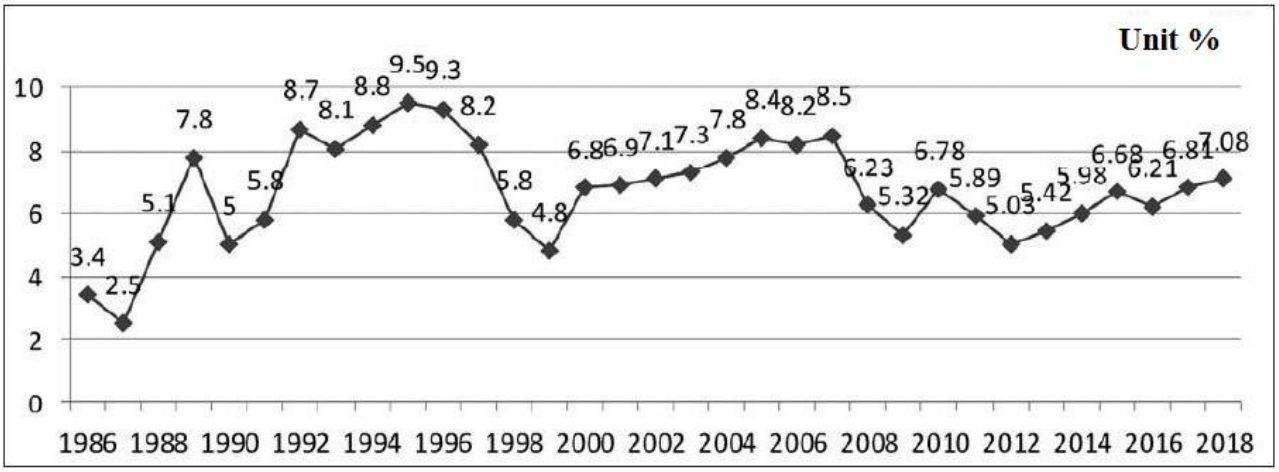

Figure 1 Vietnam's Economic Growth Rate Over the Years

Source: General Statistics Office.

2. Current Situation of Human Resource Training in the Construction Industry

2.1 Human Resources in the Construction Industry Are Both Redundant and Deficient

On average, each year Vietnam spends 30–40% of GDP on investment in the construction of technical infrastructure, development of industrial parks, industries, urbanization and cultural, educational and service works, etc. Construction activities develop at high speed, requiring huge human resources. However, from the practice of training and using labor in the past time, it shows that the human resources of Vietnam's construction industry at present have not yet met the needs of the market, specifically:

2.1.1 Lack of Workers

Not only in Vietnam, but the shortage of workers in the construction industry also happened in developed countries a long time ago. According to Forbes, in the US alone, there are about 434,000 jobs lacking workers (according to statistics in April 2019). In the assessment report on the current situation of human resource quality in the construction industry of the Vietnam Federation of Civil Engineering Associations, as of December 2020, the total number of enterprises registered in the construction industry in our country is about 78,000 enterprises, besides, there are State, family and private enterprises, etc. with about 4.3 million employees, including seasonal workers. However, this number is said to be still not enough to meet the actual demand for human resources, especially for highly qualified positions. It is forecasted that from now to 2025, the demand for human resources in the construction industry will increase by 400,000–500,000 people each year.

The shortage of laborers in the construction industry has become more serious due to the implementation of social distancing measures to prevent and control Covid-19, a large number of workers have left big cities such as Ho Chi Minh City, Hanoi to return to localities. This creates a significant shortage of labor resources, including in the construction industry. In fact, most construction sites, especially those belonging to public investment projects, are experiencing a serious shortage of labor, making it very difficult for contractors to recruit new workers to make up for the shortage of workforce at construction sites. This greatly affects the goal of accelerating the progress of projects as well as the delay in the disbursement of public investment capital.

2.1.2 Situation of Too Many Masters and Too Few Laborers

Among 78,000 enterprises operating in the construction industry in Vietnam with more than 4 million

employees, however, the number of employees with college and intermediate vocational degrees only accounts for 11.8%; the number of highly skilled workers (6th and 7th grades) only accounts for about 7% of the workforce in the construction industry. It is even more remarkable that the current average structure in Vietnam between engineers — professional intermediates — apprentices are 1 - 1.3 - 3 respectively, while in countries around the world, this figure is 1 - 4 - 10.

According to statistics from the Academy of Managers for Construction and Cities (Ministry of Construction), the whole Construction industry has more than 204,000 employees, while more than 90,000 people are cadres and officials in enterprises, which means the number of workers is just over 2 times the number of cadres and officials. This ratio reflects the current situation of too many masters and too few laborers in the construction industry in Vietnam, and the need for synchronous solutions to balance and supplement the shortage of human resources in the coming time.

Figure 2 The Demand for Human Resource Development in the Construction Industry in Vietnam Is Very Large in the Coming Time

2.1. 3 Untrained Human Resources Account for a High Percentage

The fact that the direct production workforce is a decisive factor in labor productivity, progress, and quality of the work is a matter of great concern. The capacity and professionalism of the workforce are assessed to be limited. Specifically, the number of employees with college and intermediate vocational degrees only accounts for 11.8%; the number of highly skilled workers (6th and 7th grades) only accounts for about 7% of the workforce in the industry; the percentage of workers experienced with vocational training is very low. Specifically, in 2019 according to a report of the Ministry of Construction, the training target is 28,500, of which 13,585 people are trained from professional secondary school to university. Meanwhile, the target of vocational training is 12,730 and in reality, only 50% of the target is reached, many vocational schools cannot recruit workers. Many cadres and workers who graduate from school do not have jobs or enterprises have to retrain.

Also according to the assessment of the Ministry of Construction at the Industry Review Conference in 2020 "For State management officials in construction from central to local levels, only 32% have elementary qualifications and have not been trained, particularly at the commune level, 41% have elementary qualifications and 68.7% have not been trained in state management knowledge. The contingent of officials and civil servants in the construction industry is still inadequate in terms of expertise, only 36% have expertise in construction architecture". This affects the construction activities of the society from planning management, project appraisal, licensing, construction order management, etc.

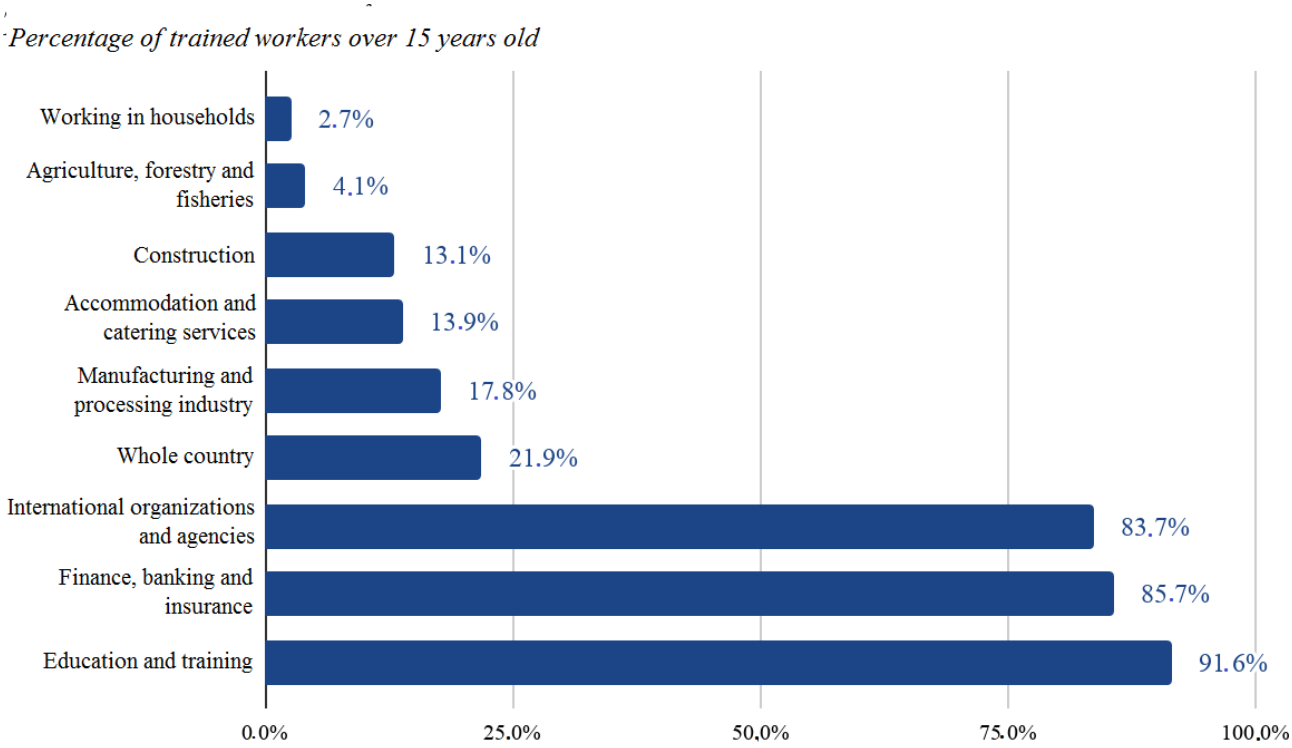

Figure 3 Percentage of Trained Workers

Source: General Statistics Office

Construction enterprise managers in charge of construction activities from surveying, project formulation, design, project management, construction, supervision, warranty, and maintenance, etc. have increased very rapidly. Among 78,000 construction enterprises with tens of thousands of managers, established easily under the Law on Enterprises, however, many managers in small and medium enterprises have not been trained and have no professional qualifications. The number of enterprises capable of competing for large projects in the market is not much, mainly due to the limited management capacity both in terms of management knowledge and experience. The percentage of cadres trained and fostered in corporate management is still very low, reaching 3.9% with foreign language and computer skills at about 17%, many fields still lack good employees and managers such as underground works, urban management, project management, urban economy, and real estate.

From the above data, it is shown that the proportion of untrained employees and workers working at construction sites, technicians, managers of enterprises, and State management agencies accounts for a large proportion and this proportion is at risk of increasing.

2.1.4 Limited Capacity

Not only is there a shortage of quantity and quality, but human resources in the construction industry also have not met the requirements of the market; the rate of trained workers in vocational skills is still very low, industrial style is slow to improve, etc. leading to low labor productivity, product quality has many errors leading to reduced competitiveness in the regional market as well as in the domestic market. At construction sites, the majority of workers follow the construction industry randomly. Many workers go up by self-study and often start with unskilled jobs. The number of people receiving vocational training has increased, but it has not met the development needs of the industry and is not balanced between training levels.

According to the Statistical Office, the construction industry currently has about 32% of untrained cadres, 41% of elementary-level cadres and 68.7% of trained cadres in communes and districts. In the whole country, only 36% of cadres are qualified and trained and it is because of too few human resources that have led to many significant influences in the process of project implementation, management and planning. Many managers in small enterprises have not been trained in technical expertise and lack management capacity, which makes the competition in construction projects not great. In addition to specialized knowledge, very few cadres are trained in other skills such as foreign languages at 3.9%, and informatics at 17%, causing difficulties in construction management and supervision. Many areas lack human resources for construction management, urban management and project supervisors.

The lack of both quantity and quality in human resources for construction activities is one of the big challenges that enterprises, especially contractors, have to face. Experts say that this situation is one of the reasons for low labor productivity, slow progress, and many errors in product quality, which threatens to reduce competitiveness in the domestic market and limit capacity when participating in international markets and the ASEAN community.

2.2 Inadequacies in Training

As of December 2020, the whole country has over 65 construction training institutions including 39 universities; 26 colleges and vocational colleges. Every year, the number of trainees is constantly increasing, but university and college training increases too quickly, while vocational and intermediate training is too few, reflecting an increasingly serious excess of masters and shortage of laborers.

One of the reasons leading to the above situation is that the arrangement and planning of the network of schools, classes, branches and professions in some localities is still inadequate due to the lack of completion of the master plan on school and classroom development; the survey of social needs for skilled workers at training institutions has not been paid attention. In addition, the majority of students have the mentality of wishing to be a “master” and parents also prefer that their child be a “master” rather than a laborer.

In addition, the training program for the Construction industry has not been agreed upon so far. The structural status of the training program framework between institutions is very different in terms of the ratio between general and specialized knowledge. According to the assessment, the organization of training at all educational levels is still focused heavily on theory, has little practical time, is not really attached to the needs of use, and is slow to update new science and technology and problems arising from practice that graduates have to undertake. As a result, it takes a long time for learners to get used to the job when they graduate, and in many cases, the recruitment unit has to conduct additional training or retraining. Meanwhile, for the Construction industry, in addition to the degree level, it is necessary to evaluate by practical skills and actual experience, because the practice reflects the essence. It is the inconsistency in the training program and content that makes the quality of human resources in the construction

industry very different at training institutions. This is also the reason why enterprises are confused when relying on qualifications to recruit personnel.

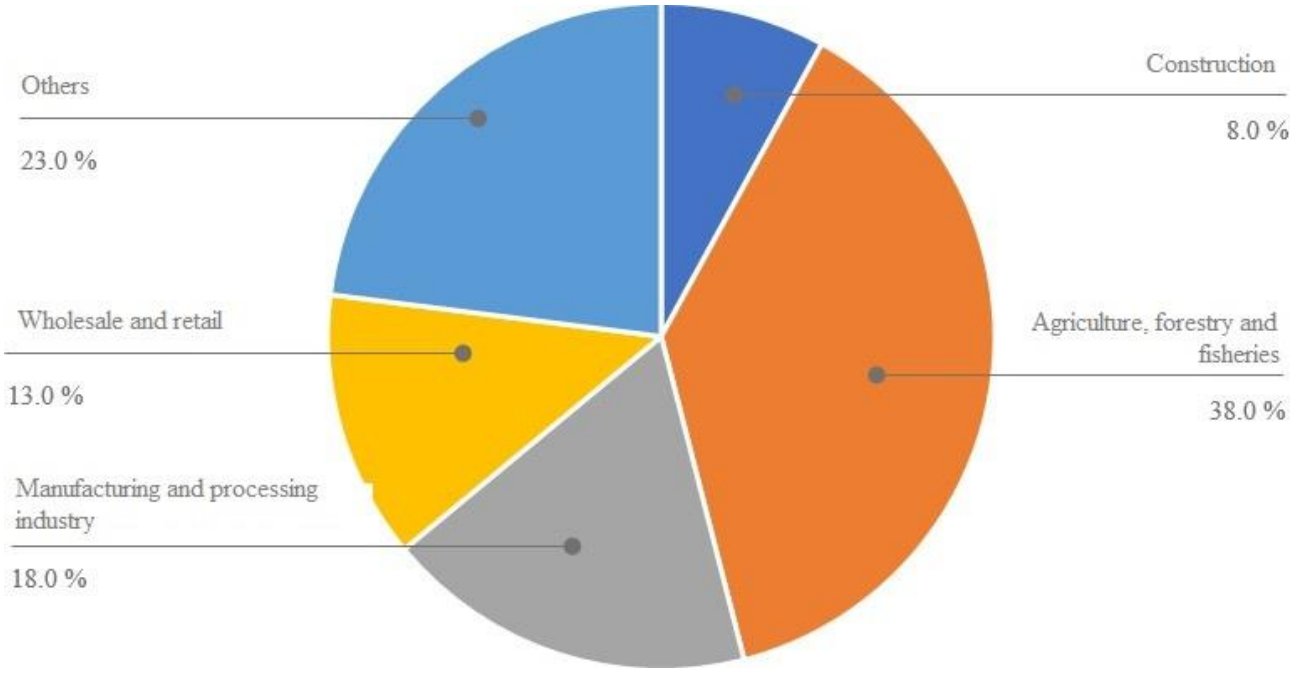

Figure 4 Vietnam's Construction Industry Employs About 4.3 Million Workers Over the Age Of 15, Ranking 5th Among All Economic Sectors of the Whole Country

Source: General Statistics Office

In addition, there is a lack of a system of foreign curricula for formal teaching due to core limitations; construction industry references are quite rich but their quality is still limited; many syllabuses published for a long time have not been republished to update and supplement new knowledge, advances in materials, techniques and outstanding technological trends of the architecture and construction industry. Meanwhile, the lecturers' and students' inability to use English-level syllabuses is one of the current great obstacles in accessing and studying foreign documents in teaching and learning at educational institutions in Vietnam in general, including construction schools. In addition, due to the great difference in content, subject names, credit coefficients, etc., and many fields are not suitable for the development conditions and characteristics of our country, the construction training schools have also faced many difficulties in recent years.

2.3 Competence of Lecturers and Students in Construction Industry

The pedagogical and professional qualifications of the lecturers should be also discussed. Currently, the whole country has about 5,000 people participating in training in construction, including 2,000 teachers, 2,580 trainers and 540 managers serving training at all levels. However, according to experts, in terms of quantity, the above contingent has not met the actual needs. The competence of educational managers and teachers at all levels is still weak and has not kept up with the renovation process. Although the percentage of lecturers meeting training standards is high, the ability to apply new teaching and educational methods, the ability to implement new assessment methods, and the competence in foreign languages and application of information technology are still poor. The structure of lecturers at universities and colleges is unbalanced, creating local redundancies and shortages. The salary policy for

lecturers is still inadequate, so it has not been able to attract good students to continue their study and research to become long-serving lecturers in the Industry.

In addition, the problem of "output" for students in general and construction industry students in particular is also not guaranteed, leading to low attractiveness for people with good ability to study. Right from the enrollment stage, students lack career advice, leading to a lack of orientation and selection of job that is not suitable for their abilities. Most training institutions do not have a strategy to link with construction enterprises, leading to a situation where the contents trained by schools are different from what enterprises need. Enterprises are the main output guarantee department for students, but the relationship between training institutions and construction enterprises is still unclear in terms of benefits, leading to the fact that most enterprises combine with training institutions with a personal relationship nature, etc.

With the current situation of construction human resource training, there is still a long gap in quality compared to the requirements of enterprises and society. Especially in the context of Vietnam joining the ASEAN Economic Community, this will be a challenge for construction workers in Vietnam if they do not have the same qualifications and quality. The quality of human resources is still limited, leading to low labor productivity in our country compared to some countries in the region. The ability to use foreign languages as communication and working tools for our country's human resources is still very limited. Therefore, at least in order not to lose at home, the construction industry needs to quickly have methodical solutions and strategies in human resource training.

3. Challenges in Training Human Resources in the Construction Industry

The National Human Resource Development Strategy clearly states that, by 2025, Vietnam will have 67.5% of workers trained in vocational education, requiring the training capacity of the system to increase by an average of 3.4% annually from now to 2025. The requirement to improve the quality and gradually integrate with the region and the world will require a breakthrough in the development of the lecturers, the development of the curricula, the syllabuses, and the investment in facilities and equipment.

However, vocational training in general and construction training in particular, to meet the needs of society, also face challenges, such as the merger between colleges and vocational colleges, intermediate and intermediate vocational schools in the period 2016-2020 which has led to difficulties in enrollment and standardization of activities of vocational education institutions.

Besides, the domestic and international labor markets require workers to meet professional standards, but the national occupational skill standard system is only being built and is initially moving towards regional and international standards.

A current difficulty for vocational training is that the documents under the Law on Vocational Education are still promulgated slowly, causing confusion for the direction and administration of state management agencies for vocational education institutions.

Figure 5 The Quality of Human Resources in Vietnam's Construction Industry Is Still Limited

From the practice of training and employing workers in the past time, it is shown that at present, high-quality human resources are still lacking compared to the social needs; many industries and fields have both surplus and shortage of human resources. Some previous traditional occupations such as urban technical infrastructure, water supply and drainage, bridges and roads, traffic, water works, construction materials, etc. are no longer attractive to learners, leading to a shortage of human resources in the future. According to Assoc. Prof. Dr. Architect Nguyen Vu Phuong, Rector of Mientrung University of Civil Engineering: For the construction field, the general goal of human resource development in the industry is: comprehensive development of training, creating a clear change in human resource quality, forming a team of high-quality human resources to meet the requirements of fast and sustainable development in the process of industrialization and modernization of the construction industry; linking training with job creation — training by address; actively dividing the labor force after university training, professional secondary school and vocational training; building a number of training institutions that meet regional and international standards of quality and high quality, meeting the increasing requirements of the domestic construction industry, participating effectively in competition in the regional and international construction market. In recent years, the training and development of human resources for the field of construction from educational institutions have the following characteristics:

Training human resources at all levels of education in general and at the university level in particular decreases every year, many traditional majors in the field of construction find it difficult to enroll in schools from North to South such as Bridge and Road, Traffic, Irrigation, Urban infrastructure, etc. This causes difficulties and imbalances in training institutions and poses a serious risk of a shortfall in the future to ensure the industry's sustainable growth.

Construction field is not attractive to learners, especially for excellent candidates due to the shift to new training industries. The quality of the input is not high, leading to a decrease in the overall training quality, and the high-quality human resources are still very short compared to the needs of the society. The jobs of students after graduation are quite diverse, jobs in corporations are often in the field, in the field of construction according to works, so they are not attractive to young women.

The recruitment units set very high conditions such as working experience, proficiency in application software, having many skills to meet a variety of jobs such as design consultancy, supervision, construction organization and

project management. However, the investment of resources in training institutions is still limited, especially in practice, experimentation and the ability to access new technologies in practice (Nguyen Vu Phuong, 2021).

4. Some Solutions to Improve the Quality of Human Resource Training in the Construction Industry

Faced with the above situation, in order to effectively implement the innovation of training and improvement of the quality of construction human resources to meet the needs of industrialization and modernization in the context of a socialist-oriented market economy and international integration, it is necessary to focus on the following solutions:

4.1 Completion of the Contents of the Construction Industry Training Program

Each school has a different training program, based on development orientation, facilities, capacity of the lecturers and the specific characteristics of admission in the region. However, in order to achieve the set goals, the renovation of key training programs is an inevitable trend that is not outside the general development of the schools. Therefore, it is necessary to focus on proposing solutions to be able to give an overall view of the innovation of training programs based on theoretical and practical bases as well as apply advanced educational models or use modern approaches suitable to the situation and conditions of Vietnam.

The development of training programs must be based on the needs of learners and society. Before building a program, it is necessary to survey practical needs. Contents and training programs are innovated in the direction of meeting market requirements, integration requirements, and training content according to the ordering address and mechanism so that students can get jobs immediately without having to be re-trained. It is necessary to fundamentally innovate from "The compilation of programs and curricula needs to pay more attention to the actual needs of learners and the factors of applying teaching materials as well as the topics of knowledge and skills suitable for learners. The time also needs to be allocated more rationally and scientifically. Programs and syllabuses are compiled taking into account the needs of learners, which will avoid making learners frustrated and bored".

Among the factors related to the innovation of the training program, the documents for program development are considered an important factor contributing to the success of the whole program. Program - documents are one of the factors that determine the quality and effectiveness of the entire training process. For innovation and improvement of the quality of education and training, it is necessary to thoroughly grasp the motto of linking program-document contents with the actual situation, ensuring learning goes together with practice and ensuring practicality and efficiency. Program development and document compilation need to adhere to the following principles: Teach what students need, not what the training institution has. The program content of each type of training and retraining must derive from the practical needs of each field of work, meet management requirements and be consistent with legal documents, regimes and policies from time to time.

For each group of learners, it is necessary to focus on researching and building framework programs and standard programs. On the basis of these programs, depending on the specific training time and form, programs will be supplemented to meet the practical requirements of each subject. The implementation of research on scientific topics is combined with the development of training programs. The content of approved programs is taken as a legal basis when implementing training and fostering.

To do this job well, it is necessary to selectively update the program and regularly conduct periodic surveys of students' and employers' needs, determine the necessary skills for the needs of the working environment, and have

a strategy to approach modern teaching materials so that learners can practice skills and acquire knowledge appropriate to the profession in a scientific manner. Besides, creating close connections with enterprises and former students in order to grasp the actual recruitment needs and the responsiveness of students after graduation is an indispensable factor.

The training programs in the Construction industry need to achieve high consistency in practice, flexibility and accuracy in training objectives, duration, content, syllabus, lecturers, inspection and evaluation. Attention should be paid to the length of practice, field trips, and listening in for practice at construction material production facilities, construction consulting companies or internships at construction works. The teaching of specialized knowledge needs to be defined as a combination of specialized lecturers and people responsible for program development.

The renovation process of the training program in the Construction industry should be closely monitored, and the inspection and evaluation of the training program should be carried out annually in order to grasp the students' expectations and determine the extent to which those expectations are met. The reality shows that many training programs are subject to the discretion of the program designer, only meeting the needs at the present time but cannot meet the needs of learners and the labor market. Therefore, educational institutions need to consult students through learning to get more feedback and reasonable adjustments in the process of teaching and training.

4.2 Capacity Building of Teachers at All Levels in the Construction Industry

The fostering and strengthening of the capacity of lecturers to meet teaching requirements require lecturers to have extensive, up-to-date and practical professional knowledge, especially skills in analysis, summary and quick problem-solving.

In order to realize the goal of training quality construction human resources, schools need to build a contingent of lecturers who are qualified, capable, and have high professional qualifications and pedagogical skills. In teaching activities, the lecturers are always enthusiastic, dedicated to the profession, fully and punctually attend class, prepare lessons, prepare teaching materials, check lessons, and grade regularly in accordance with regulations. The school board needs to strengthen the inspection of the lesson plans and teaching time of the lecturers and innovate the method in the direction of taking students as the center to receive lessons actively and creatively. In addition to imparting professional knowledge, specialized techniques, and using supporting equipment, lecturers need to constantly update and add more knowledge, situations, practical skills, newly promulgated documents and laws in the field of construction to help students understand and firmly grasp the knowledge they have learned.

In the knowledge economy, with the globalization of information and the increasing requirements of updating new knowledge, the lecturers, in addition to professional knowledge, skills and practical experience, must also be masters of modern technology to serve the process of transmitting information to learners, and must firmly grasp electronic library systems, electronic syllabuses, modern teaching methods, ways of exploiting and searching for global information, etc. to share with learners. In the era of science and technology, especially when information technology is booming like today, the exploitation and application of modern technologies in education and training is very important and brings great effects to society. Instead of having to find related printed materials and documents, lecturers and learners can use the Internet to exploit the necessary knowledge. The electronic library systems, electronic syllabuses, distance teaching and training methods, etc. have increasingly opened up vast prospects in a global learning society.

In addition to the application of modern technology in education, training and retraining in the construction industry, the meaning and role of the lecturer directly standing on the podium are still important. However, the role

of the lecturer is only really meaningful when the lecturer-student interaction pair becomes a unified whole in action and thinking. This means that the professional knowledge and experience conveyed by the lecturers need to attract and convince students with new, scientific and practical content. There should be an interaction between lecturers and students, and similarities in thinking and practice. In order to achieve the above requirements, the teaching and communication methods of the lecturers are of special importance.

In order to achieve the above requirements, each lecturer, in addition to professional knowledge and expertise in his or her field of expertise, must actively enhance the study of extensive professional knowledge, experiences and practical knowledge in many different related fields. Architecture, planning, and construction are open fields that include technical sciences, natural sciences, social sciences and arts. Therefore, teachers specializing in planning and construction architecture, in addition to the basic knowledge of planning architecture normally trained in universities, need to expand their understanding and different knowledge such as sociology, psychology, aesthetics, philosophy, etc. Lecturers, in addition to self-study, should participate in intensive professional training courses, tours, and receiving training at home and abroad, and especially be equipped with a methodology to impart to students the ability to self-study.

Along with constantly fostering professional skills, learning experiences, cultivating knowledge and professional skills, and innovation in teaching, the lecturers need to have a professional conscience, a sense of discipline, and an industrial style at work.

When we determine that the study, research and improvement of professional qualifications, awareness and experience are not only a professional and social responsibility but also a spiritual need as an important aspect of life, then the level of expertise, meaning and value of life is basically enhanced

4.3 Active Innovation of Teaching Methods to Improve Training Quality

A scientific and appropriate teaching method will change the role of the teacher and create a passion for learners. The information is received effectively when it is conveyed in an easy-to-understand and easy-to-remember way, becoming the intellectual foundation for students and the basis for forming skills in practice. Training does not only bring certain specific knowledge to students, but more importantly, it provides a methodology and a way for students to be able to constantly self-research, actively and creatively acquire knowledge, in accordance with actual needs.

A mechanism is created to encourage lecturers to apply active and student-centered teaching methods: Distribute groups, the groups exchange and discuss to promote students' dynamism and creativity. In teaching, it is necessary to well implement the motto "linking theory to practice" and "learn by doing" and divide it into two phases: at the school's practical workshop and at the production facility, equip students with practical knowledge and ability to practice the jobs of a profession, practice their ability to work independently, and apply science, techniques, and technology to work, etc., it is necessary to focus on innovating teaching methods in the direction of changing from "teaching what the lecturer has to teaching what the students need", avoiding presentations in a passive form.

These methods play a crucial role in the training of truly competent officers who can creatively solve problems posed by the diverse and ever-changing practice of the Construction industry.

In addition to innovating teaching methods, it is necessary to actively develop and implement programs to improve skills in using English and other common foreign languages for civil servants and public employees in the Construction industry, including the training and retraining programs for qualified lecturers and teachers according to regulations.

4.4 Strengthening of Vocational Skills Development Training for Students Majoring in Construction

To contribute to improving labor productivity and promoting the development of skilled human resources to meet the requirements of the new situation, education and training institutions need to identify the main goals of developing lecturers, invest in modern vocational training equipment and focus on training vocational skills for students, accordingly, it is necessary to focus on solving some urgent problems in training such as:

1) Conducting a survey of human resource needs for each industry and profession in each period which identifies key industries and professions to prioritize investment and development resources; (ii) Focusing on investing in modern equipment for key industries and trades; increasing efficiency in the use of invested equipment. Developing a system of practice rooms, internship rooms, and production workshops. Creating opportunities for students to practice skills while studying at school. Strengthening cooperation with other training institutions or production and business establishments to coordinate the use of modern equipment in equipping the lecturers and students with vocational skills; (iii) Enhancing vocational skills for lecturers through vocational training or sending lecturers on field trips to enterprises and production and business establishments in the field of construction. Signing cooperation agreements with enterprises in fostering lecturers, interns and recruiting workers; (iv) Strengthening the trend of automation and international integration into the training program; focusing on skills training to ensure that learners have professional skills, digital skills, soft skills, entrepreneurial skills and foreign languages, etc. to adapt to the requirements of the new labor market; (v) Promoting communication associated with enrollment to propagate and create a change in society's awareness and consensus on vocational education development, the position and role of skilled human resources, the propaganda contents are disseminated to learners and their families in the process of learners studying at schools and the process of implementing career counseling at high schools.

Figure 6 Focus on Developing Vocational Skills for Students Majoring in Construction

4.5 Training Innovation Associated With Digital Transformation

The boom in technology is ushering in a new era for education. Education trends are gradually changing: smarter, faster and less expensive. Digital transformation is an inevitable trend, happening very quickly, especially in the context of the current Industrial Revolution 4.0. Digital transformation in vocational education aims to deploy vocational education activities in the digital environment, to promote the application of information technology in management, teaching activities, teaching methods, testing and evaluation to increase the efficiency of management and expand the methods and opportunities to access vocational education, creating a breakthrough in quality, rapidly increasing the amount of training, contributing to improving the quality of skilled human resources, increasing labor productivity and national competitiveness in the context of international integration.

The plan for digital transformation of the construction industry in the period 2020 - 2025, with orientation to 2030 according to Decision No. 1004/QD-BXD dated July 31, 2020 with the goal that in the period 2020 -2025, human resources for the construction industry will meet the requirements of digital transformation, accordingly, training schools under the Ministry of Construction will meet the digital transformation needs of the Construction industry and apply digital technology in training, student management and school administration. The digital transformation process needs management institutions and synchronous solutions to ensure training quality, by 2025, construction training schools need to effectively perform the following tasks:

Innovation and development of training programs: Build and manage training programs in the direction of LEARNING, TESTING and EXAMINATION on mobile platforms; real-time online teaching; electronic learning materials; reporting management and evaluation after training; and output standards of training programs of degrees with digital capabilities integrated and training contents suitable for digital transformation.

Investment and upgrading of digital infrastructure, platforms and learning materials: Form a digital foundation for vocational education and a repository of digital resources and materials for teaching and learning activities, ensuring basic digital infrastructure and digital platform to connect and exploit with the digital platform for national vocational education.

Digital management and administration: Digitize the learning process, learning outcomes, vocational education diplomas of learners and connect and integrate data into the digital environment; make periodical reports and statistical reports on vocational education in a digital environment and connect, integrate, and share digital data on the Government Reporting Information System.

Institutions, mechanisms and policies for digital transformation in the field of vocational education are developed and completed; training programs and contents at all levels of vocational education are developed under the requirements of digital transformation in the economy and international integration; infrastructure, platforms, equipment and digital learning materials are developed.

Skills in using information technology are trained, ensuring information security at all levels; vocational training and retraining are conducted so that students as well as lecturers or officials in the training institutions have skills to be ready for the digital environment.

Digital technology is applied to be able to assign and self-assess homework, as well as check student's preparation before going to class; and technology is applied to serve education towards personalization for each object.

5. Conclusion

With the trend of globalization and strong international integration, the impact of the fourth industrial revolution and the COVID-19 pandemic are posing urgent requirements for improving labor skills. Priority is given to the development of human resources in the Construction industry with high skills and workmanship, management capacity, professionalism, and the ability to use technology which is an urgent issue for improving labor skills and meeting regional and international market requirements. To meet the requirements set forth, the State needs to have appropriate macro-regulations, mechanisms and policies in training high-quality human resources in the construction industry, and at the same time overcome the shortcomings and imbalances between training professions through the synchronous and effective implementation of many groups of solutions, especially focusing on renovating training programs, improving the capacity of teachers, promoting vocational skills development training for students and renovating training associated with digital transformation in current training institutions. The investment is strengthen in facilities for training and scientific research, especially in equipment for teaching, scientific research and experiments to enhance training linking theory to practice.

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